Amendments to the Specification

Please replace the second paragraph of the Technical Background with the following replacement paragraph.

One phenomenon preventing the disposition of smaller features on photomasks is the Fabry-Perot Interference Effect. As shown in Figure 1, the transmission (T) of illumination light through a photomask is dependent on the parameter ϕ. There are periodic variations in the intensity of the light as ϕ changes. The transmission ripple may result in uneven exposure of photoresist, linewidth variations, and lower illumination light intensity during exposure. One explanation is that the surfaces of the photomask blank are to a high degree plane-parallel. Thus, the mask blank approximates a Fabry-Perot plate. In the case of a coherent plane wave incident on a mask blank, the transmission can be written as:

$$T = 1/(1 + F\sin^2\phi) \qquad (1)$$

wherein,

$$F\sin^2\phi = \{4R/(1-R)^2\} * \sin^2[(2\pi/\lambda)\cos\theta(nL) + \phi_0]. \qquad (2)$$

F is commonly referred to as the finesse factor. The Finesse factor F is largely dependent on R. R is a measure of the reflectivity of the two parallel plates in a Fabry-Perot interferometer. In this case, the plates are the plane parallel surfaces of the photomask blank. λ refers to the wavelength of the illumination variation (in the UV range in most lithography applications), θ is the angle between the propagation direction of the plane wave in the mask and the normal to the mask surfaces, and ϕ_0 is an arbitrary fixed constant. Since typical UV imaging systems employ monochromatic light, wavelength λ is fixed. Further, θ is also fixed at a specific angle, 0° for normal incidence, or $\approx 10^\circ$ for annular illumination. Thus, the variables within ϕ are n and L. L is the thickness of the mask, and n is the refractive index of the mask material. <u>From equation 2, provided above, the change in parameter ϕ can be expressed as equation (3) by routine algebraic manipulation.</u>

$$\underline{\Delta\phi = (2\pi/\lambda)\cos\theta\Delta\,(nL) = (2\pi/\lambda)\cos\theta(L\Delta n + n\Delta L) \qquad (3)}$$

ΔL relates to the surface roughness or the small tilt of the mask blank surfaces. ΔL can have a peak-valley difference of about 3.5nm on a standard polished surface, and about 1.8nm for a super polished surface. Δn refers to the birefringence of the photomask blank. If the index of refraction is homogeneous, then Δn is zero, the change in parameter ϕ becomes:

$$\Delta\phi = (2\pi/\lambda)\cos\theta\ n\Delta L \qquad (4);$$

If the surface roughness is substantially eliminated, ΔL is essentially zero, and the change in parameter ϕ becomes:

$$\Delta\phi = (2\pi/\lambda)\cos\theta\ L\Delta n \qquad (5);$$

Equation (5) links birefringence, i.e., changes in the refractive index within the mask material, to image defects. What is needed is a method of mitigating Fabry-Perot interference effects in the photomask such that the transmission T is substantially constant at an optimum level.

Please replace the second paragraph of page 5 with the following replacement paragraph.

As embodied herein, and depicted in Figure 2, a perspective view of photomask 10 in accordance with a first embodiment of the present invention is disclosed. Photomask 10 includes anti-reflection coating 12 disposed on optical blank 20. In the first embodiment, coating 12 includes one layer of MgF_2 anti-reflective material. In another embodiment, coating 12 includes a single layer of Al_2O_3 anti-reflective material. Optical blank 20 may be of any suitable type, but there is shown by way of example a fused silica mask blank. ~~The mask blank may also be fabricated using.~~ Those of ordinary skill in the art will also recognize that doped fused silica, synthetic quartz glass, calcium fluoride, or other doped glasses may be used as well, depending of course, on the application or desired effect. Those of ordinary skill in the art will recognize that the specifics of the AR coating, e.g., the number

of layers, refractive index properties of each layer, or layer thicknesses, are a function of the operating wavelength and optical characteristics of the optical blank.

Please replace the paragraph beginning a page 5 with the following replacement paragraph.

For example, the control glass experiences a 0.38% transmission variation for a birefringence of approximately 1 x 1.43 nm/cm. On the other hand the test glass experiences a 3.75% transmission variation for a birefringence of approximately 10 x 1.43 nm/cm. When coating 12 is disposed on the control glass, the transmission variation is reduced to 0.06%, about 16% of the value when no coating is employed. When coating 12 is disposed on the test glass, the transmission variation is reduced to 0.61%, about 16% of the value when no coating is employed. Thus, in each case, the transmission variation of an AR coated mask blank is reduced to less than one-sixth of the value of [[a]]<u>an</u> uncoated blank. Similar transmission variation improvements are obtained for the other glass parameters.